

A

ALL SOLID STATE DC
DIFFERENTIAL
OPERATIONAL
POTENTIOMETRIC
AMPLIFIERS

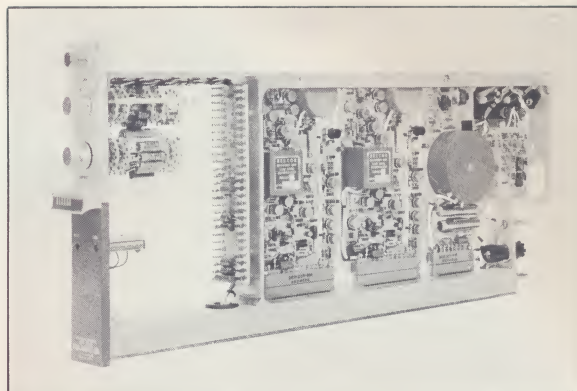
complete systems compatibility.....

REDCOR



REDCOR

series 361 wideband/low level DIFFERENTIAL DC AMPLIFIERS



Incorporating the unique Redcor dynamic bridge configuration for differential amplification, the completely solid-state 361 series provides the highest standards of field proven performance and reliability. The various models provide the most flexible range of amplifiers for gain and bandwidth selection and in addition, three different package configurations. Specific Models are:

Model 361022 . . . Gains: 10, 20, 50, 100, 200, 500, 1000 (Controlled by 7-position front panel knob)
(case style E) Bandwidth: .1, .3, 1, 3, 10, 30, 100 Kc (Controlled by 7-position front panel knob)

Model 361040 . . . Gains: 10-20, 20-50, 50-100, 100-200, 200-500, 500-1000, 1000-2000
(case style E) (Controlled by 7-position front panel knob)
Vernier control by 10-turn vernier potentiometer with micro dial calibrated in 1000 steps.
Bandwidths of: ⁽⁵⁾ .1, .3, 1, 3, 10, 30, 100 Kc (Controlled by 7-position front panel knob)

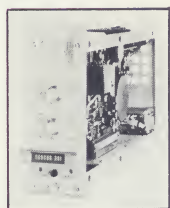
Model 361100 . . . Gains: Any four selectable between 10-1000 (Controlled by means of 12 volt mercury relays ⁽⁶⁾)
(case style E) Bandwidth: Single selectable between .1-100 Kc

Model 361201 . . . Gains: 10, 20, 50, 100, 200, 500, 1000 (Controlled by 7-position front panel knob)
(case style K) Bandwidth: .1, .3, 1, 3, 10, 30, 100 Kc (Controlled by 7-position front panel knob)

⁽⁵⁾ Vernier Bandwidth: Vernier control will affect the selected bandwidth inversely proportional to the vernier position.

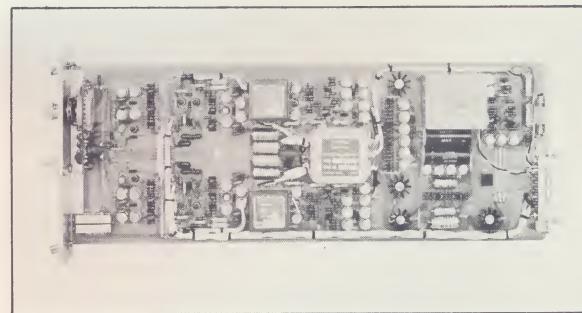
⁽⁶⁾ Relay Control: Standard voltage relays utilized are 12 volts, other voltages can be provided, gain access time (typically 6 ms + settling time).

These Models use rack 100835 (style J) — Bench Case 100745 (style H) For more detailed specifications, see Page 7.



REDCOR

model 361400 DIFFERENTIAL AMPLIFIERS



This model is one of a new group of amplifiers which exhibit all of the time proven specifications of the dynamic bridge type Redcor 361022, etc. A unique packaging technique, however, has substantially reduced the cost. Specific models in this group are:

Model 361400 . . . Gains: 10, 100, 500 and 1000 (Controlled by 4-position front panel switch)
(case style B) Bandwidth: Single selectable from .1-100 Kc (Control: See Note below)

Model 361401 . . . Gains: 30, 100, 300 and 1000 (Controlled by 4-position front panel switch)
(case style B) Bandwidth: Single selectable from .1-100 Kc (Control: See Note below)

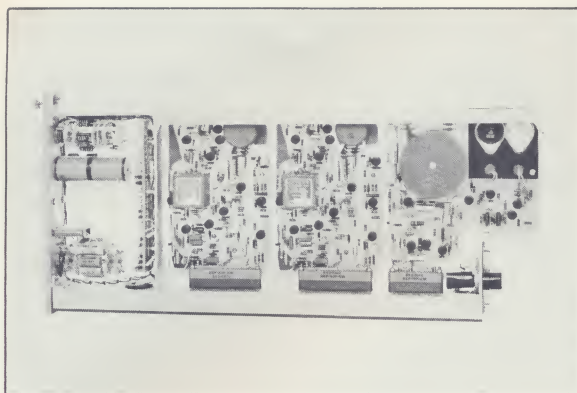
Model 361404 . . . Gains: 10-30, 30-100, 100-300, 300-1000 (Controlled by 4-position front panel switch)
(case style B) Vernier control is accomplished by a 10-turn potentiometer with a front panel 1000 position micro dial.

Bandwidth: ⁽⁵⁾ Single selectable from .1-100 Kc (Control: See Note below)

NOTE: The bandwidth control of the 361400, 361401 and 361404 is accomplished by two capacitors. These capacitors, and therefore the bandwidth, can be easily changed as they are held by spring loaded component mounting clips, which require only finger pressure to release.

⁽⁵⁾ Vernier Bandwidth: Vernier control will affect the selected bandwidth inversely proportional to the vernier position.

These Models use rack 101080 (style G) — Bench Case 101085 (style F) For more detailed specifications, see Page 7.



REDCOR series 371

fast overload recovery DIFFERENTIAL DC AMPLIFIERS

The Redcor series 361 and 371 amplifiers are both chopper stabilized, and use the same dynamic bridge configuration in achieving extremely high performance in gain accuracy, linearity and stability, coupled with wide bandwidth and high common mode rejection.

These features make the amplifiers very desirable for use in low level multiplexing applications. The 371 series, however, have specifically outstanding performance in fast recovery from overloads typically found in low level multiplexing applications. Specific Models are:

Model 371022 . . . Gains: 10, 20, 50, 100, 200, 500, 1000 (Control: By means of 7-position front panel switch)
(case style E) Bandwidth: .1, .3, 1, 3, 10, 30, 50 Kc (Control: By means of 7-position front panel switch)

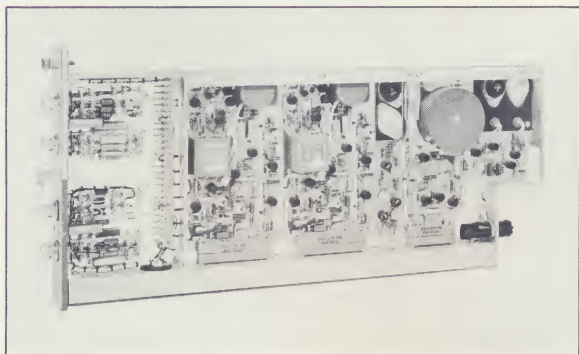
Model 371040 . . . Gains: 10-20, 20-50, 50-100, 100-200, 200-500, 500-1000, 1000-2000 (Control: By means of 7-position front panel switch)
(case style E) Vernier: Full interpolation by means of 10-turn potentiometer with front panel mounted micro dial with 1000 divisions.
Bandwidth: (5) .1, .3, 1, 3, 10, 30, 50 Kc (Control: By means of 7-position front panel switch)

Model 371100 . . . Gains: Four selectable between 50-1000 (Control: by means of 12V mercury relays (6))
(case style E) Bandwidth: Single selectable from .1 cps — 50 Kc

(5) Vernier Bandwidth: Vernier control will affect the selected bandwidth inversely proportional to the vernier position.

(6) Relay Control: Standard voltage relays utilized are 12 volts, other voltages can be provided, gain access time (typically 6 mS + settling time).

These Models use rack 100835 (style J) — Bench Case 100745 (style H) For more detailed specifications, see Page 7.



REDCOR series 500

single-ended/dual-channel POTENTIOMETRIC DC AMPLIFIERS

The Redcor series 500 offers a unique combination of two single-ended amplifiers contained compactly in one case with a common power supply, with extremely low cost per channel. The unit embodies a completely solid-state design.

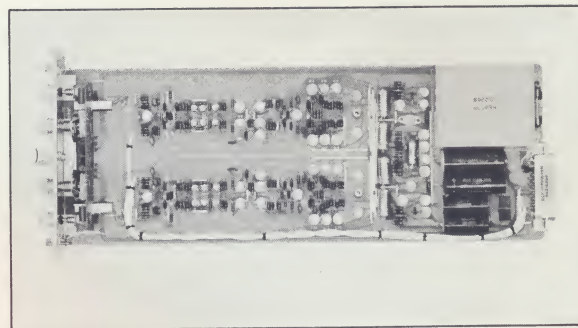
The external dimensions of the series 500 are identical to those of Redcor series 361 and 371, allowing the 10 unit rack to house mixed groups of differential and dual-channel amplifiers, if desired. In addition, the series 500 utilizes circuit cards which are identical to and interchangeable with those available in series 361 and 371.

Model 500022 . . . Gains: 10, 20, 50, 100, 200, 500, 1000 (Controlled by 7-position front panel knob)
(case style E) Bandwidth: .1, .3, 1, 3, 10, 30, 100 Kc (Controlled by 7-position front panel knob)
These Models use rack 100835 (style J) — Bench Case 100745 (style H)

Note: The output current total for both channels is 100 mA,
i.e. 50 mA per channel or 90 mA and 10 mA.

For more detailed specifications, see Page 7.

REDCOR series 265 GALVANOMETER AMPLIFIERS



The Redcor series 265 Galvanometer Amplifiers represent a new design approach to achieve economic, high performance DC amplifiers. Both single ended and differential versions are available as specified below. Solid state circuitry is employed throughout and each amplifier has a self-contained power supply (dual channel units share same power supply).

Features of the series are: Extremely high internal loop gain resulting in excellent gain accuracy and linearity. Utilization of Redcor's proven dynamic bridge configuration for differential amplification. High current output capability and very low dynamic output impedance for driving such loads as galvanometers. Damping resistor provision externally.

Specific versions of the series are as listed below:

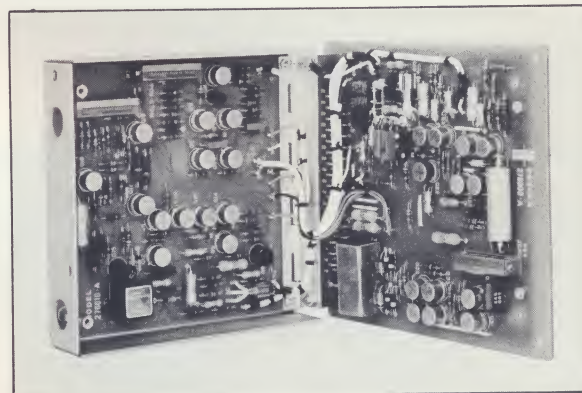
	MODEL	
Single ended Dual channel	265050	Gains: 1, 2, 5, 10, 20
	265055	Gains: 10, 30, 100, 300, 1000
Differential Single channel	265060	Gains: 10, 30, 100, 300, 1000

The above amplifiers are standard. Other versions available include, input attenuator, full interpolating vernier, ± 10 volt offset referred to the output, and output L pad damping resistors provision.

These Models use rack 101080 (style G) — Bench Case 101085 (style F)

For more detailed specifications, see page 6.

REDCOR series 276/278 Sample and Hold AMPLIFIERS

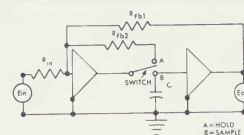


Both models of the REDCOR Corporation Sample and Hold perform the same function, the difference being that the Model 278 has a self-contained power supply, whereas the Model 276 requires external DC regulated power. The Sample and Hold function is required to improve the sampling aperture of high speed Analog to Digital Converters, and to improve the speed of successively sampling many channels of incoming data (via Multiplexers) and then converting the data to digital form. Both of the models are completely solid state.

Sample...When the switch is in the sample position, the entire device is enclosed in an overall feedback loop via resistor R_{fb} and performs as a single ended operational amplifier with the attendant features of summation, scaling, offsetting, etc. Sample Time: 10 Microseconds Min.

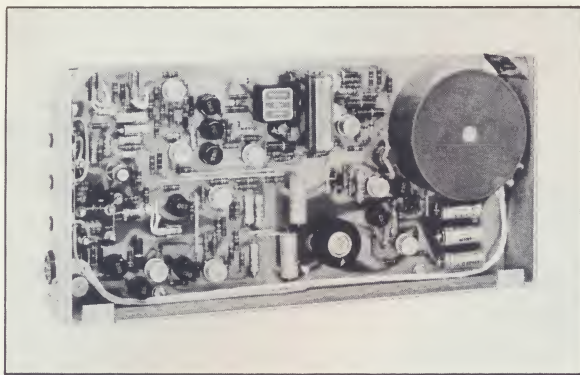
Hold...When the switch is in the hold position, the device divides into two parts. The input amplifier is disconnected from the storage capacitor C so that the output voltage via the high input impedance output amplifier buffers the stored value. Hold Time: 100 Microseconds Max. for $<0.01\%$ drift.

For more detailed specifications, see page 6.



Aperture time Less than $1\mu\text{Secs}$
Hold time Less than $100\mu\text{Secs}$ for
less than 0.01% drift

	276	278
Power Requirements	$\pm 12.5\text{V}$ at 60 mA 1% regulation noise less than 10mV P/P	115V/230V 50-500cps 5 watts
Mechanical Size.	5" x 5.4" x 1"	7" x 15" x 3"
Mounting.	Redcor Corp. Standard Module Chassis	Any surface
Connector Type.	50 pin	42 pin Winchester XMRE



REDCOR series 259/260

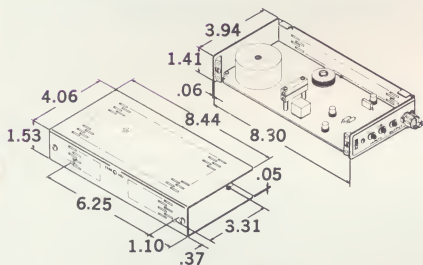
single ended DC AMPLIFIERS

The Redcor 259 and 260 Series Amplifiers are designed for high level general purpose system applications. Both Amplifiers are self contained and utilize solid state circuitry throughout.

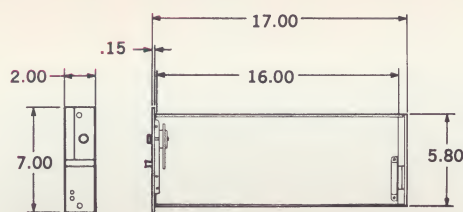
Model 259050 ... is an operational configuration with input and feedback resistors self contained and can be used for scaling, zero offsetting, summation and other operational amplifier functions.

Model 260050 ... is a potentiometric positive unity gain with the attendant features of high input impedance, excellent gain accuracy and linearity. The applications for this Amplifier are as input Amplifiers to low impedance devices such as A/D Converters and as output Amplifiers for high level single ended multiplexers. Both the 259 and 260 utilize the same mechanical package and printed circuit card.

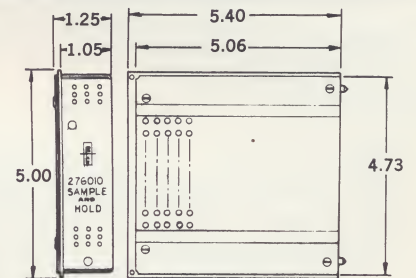
For more detailed specifications, see page 6.



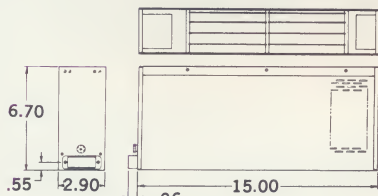
Case Style A



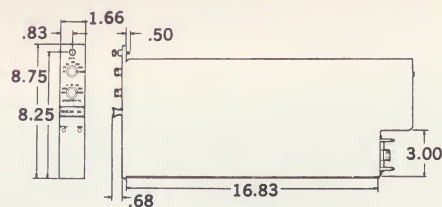
Case Style B



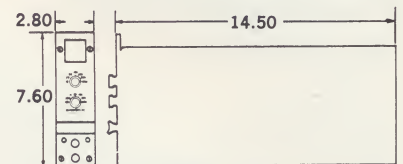
Case Style C



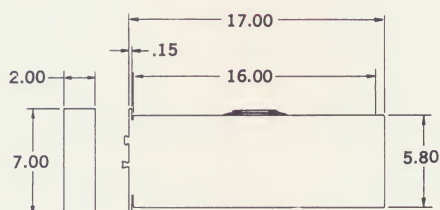
Case Style D



Case Style E



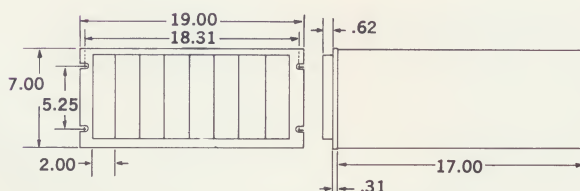
Case Style K



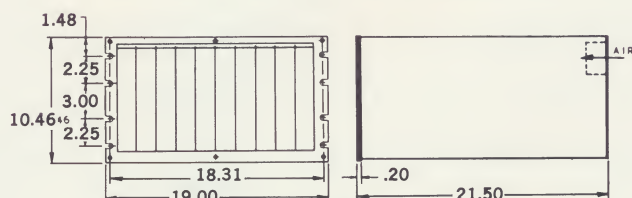
Bench Case Style F



Bench Case Style H



Rack Mount Style G



Rack Mount Style J

Specifications:

	259 / 260	265	276/278
GAIN			
Range.....	—1 and —10	+1 only	—1
Accuracy } at DC.....	±0.02%	±0.002%	±0.02%
Linearity }.....	±0.01%	±0.002%	±0.01%
Stability }.....	±0.01%	±0.002%	±0.01%
Control.....	Change Connector	None	None
Vernier.....	None	None	None
BANDWIDTH (3db down)			
Range (DC→).....	200 KC	100 KC	200 KC
Control.....	None	None	None
Slewing Rate (at max BW).....	1.2 x 10 ⁷ volts / sec	6 x 10 ⁶ volts / sec	3 x 10 ⁶ volts / sec
COMMON MODE			
Rejection (DC to 60cps).....	NA	1000 x Gain Max 100db	NA
Max Voltage.....	NA	±10V DC or Peak AC	NA
Input Impedance (DC to 60 cps).....	NA	100 Megohms either line	NA
Line Unbalance.....	NA	0-1000 ohms either line	NA
Input Guard Shield.....	NA	None	NA
Balance Control.....	NA	None	NA
Overload.....	NA	20 volts or 20mA	NA
CHOPPER INTERMODULATION	Less than 0.01%	None	Less than 0.01%
DRIFT (after 1 hr warm-up)			
8 hrs constant temp.....	±1mV RTO	±100μV RTO	±1mV RTO
30 days constant temp.....	±5mV RTO	±1mV RTO	±5mV RTO
Temperature coeff / °C.....	±100μV RTI	±30μV RTO	±100μV RTO
NOISE ⁽²⁾ (Zero source resistance)	300μV RMS RTO	150μV RMS RTO	300μV RMS RTO
For R.M.S. confidence factor use 99.9%		(10μV RTI + 300μV RTO) RMS	
SOURCE RESISTANCE	Operational input (1)	0-1000 ohms	Operational input (1)
INPUT IMPEDANCE (at DC)	100 Kilohms	100 Megohms	100 Kilohms
SETTLING TIME (For full scale step output at max bandwidth).....	20μSecs to 0.01%	20μSecs to 0.02%	10μSecs to 0.01%
OUTPUT			
Voltage.....	±10V	±10V	±10V
Current.....	±10mA (Short Circuit Proof)	±100mA (Short Circuit Proof)	±10mA (Short Circuit Proof)
Loading (max).....	1000 ohms and 500 pf	100 ohms and 5000 pf	1000 ohms and 500 pf
Impedance (at DC) (3).....	10 milliohms	10 milliohms	10 milliohms
OVERLOAD CONDITIONS			
Input.....	50V or 50mA	20V or 20mA	20V or 20mA
Recovery Time.....	150 millisecs	1mS to within 0.1%	150 millisecs
TEMPERATURE RANGE	0-50 °C	0-50 °C	0-50 °C
CASE TO OUTPUT ISOLATION	Greater than 1000 Megs	Greater than 1000 Megs	Greater than 1000 Megs
POWER REQUIREMENTS ⁽⁴⁾	115 / 230V 50-500cps 5 watts	115 / 230V 50-500cps 10 watts	See Page 4
DIMENSIONS			
Individually.....	8.44" x 4.06" x 1.53" (excluding connector)	7" x 2" x 17" (excluding connector)	See Page 4
Case Style.....	A	B	276 C 278 D
Weight.....	3 lbs	5 lbs.	5 lbs.
Shipping Weight.....	5 lbs	7.75 lbs.	7.75 lbs.
MOUNTING HARDWARE			
Bench Case.....	NA	101085	NA
Dimensions.....	NA	7" x 2" x 17" (excluding connector)	NA
Style.....	NA	F	NA
Rack Mount (RETMA).....	NA	101080	NA
Dimensions.....	NA	7" x 17" x 19" (excluding connector)	NA
Style.....	NA	G	NA
For Specification Model Information.....	See Page 5	See Page 4	See Page 4

(1) Operational input (Source resistance): Source resistances will add to the input resistor of the amplifier—gain can be calculated from

$$\frac{R_{FB}}{R_S + R_{INPUT}} \text{ where } \begin{aligned} R_S &= \text{Source resistance} \\ R_{FB} &= \text{Feedback resistance} = 100K \\ R_{INPUT} &= \text{Input resistance} = 10K \text{ gain } 10, 100K \text{ gain } 1 \end{aligned}$$

(2) Noise Confidence Factor: To obtain peak to peak noise figures from RMS figures, use the multipliers below.

Confidence Factor	Multiplier
99%	5.15
99.9%	6.58
99.99%	7.68

10-1000

 $\pm 0.02\%$
 $\pm 0.01\%$
 $\pm 0.01\%$

 See Page 2
 Full interpolating

 100 cps - 100 Kc
 See Page 2
 6×10^6 volts/sec

 1000 x Gain
 ± 10 V DC or peak AC
 1000 Megohms either line
 0-1000 ohms either line
 None
 None
 20 volts or 20mA

Less than 0.01%

 $\pm \left\{ \begin{array}{l} 3\mu\text{V RTI} + 300\mu\text{V RTO} \\ 10\mu\text{V RTI} + 300\mu\text{V RTO} \\ 1\mu\text{V RTI} \text{ typically} \end{array} \right.$
Bandwidth Noise

100Kc	(10 μ V RTI + 300 μ V RTO) RMS	
1Kc	20 μ V RTI peak/peak	} +300 μ V RMS RTO
300cps	14 μ V RTI peak/peak	
30cps	4 μ V RTI peak/peak	

0-1000 ohms

1000 Megohms

20 μ Secs to 0.01%
 ± 10 V
 ± 100 mA (Short Circuit Proof)
 100 ohms and 5000pf
 10 milliohms

 20V or 20mA
 150 millisecs

 0-50 °C
 Greater than 1000 Megs

115/230V 50-500cps 5 watts

 See Page 2
 See Page 2
 5 lbs.
 7.75 lbs.

 See Page 2
 See Page 2
 See Page 2
 See Page 2
 See Page 2
 See Page 2

See Page 2

10-1000

 $\pm 0.02\%$
 $\pm 0.01\%$
 $\pm 0.01\%$

 See Page 3
 Full interpolating

 100 cps - 50 Kc
 See Page 3
 3×10^6 volts/sec

 1000 x Gain
 ± 10 V DC or peak AC
 1000 Megohms either line
 0-1000 ohms either line
 None
 None
 20 volts or 20mA

Less than 0.01%

 $\pm \left\{ \begin{array}{l} 3\mu\text{V RTI} + 300\mu\text{V RTO} \\ 10\mu\text{V RTI} + 300\mu\text{V RTO} \\ 1\mu\text{V RTI} \text{ typically} \end{array} \right.$
Bandwidth Noise

50Kc	(10 μ V RTI + 300 μ V RTO) RMS	
1Kc	20 μ V RTI peak/peak	} +300 μ V RMS RTO
300cps	14 μ V RTI peak/peak	
30cps	4 μ V RTI peak/peak	

0-1000 ohms

1000 Megohms

40 μ Secs to 0.01%
 ± 10 V
 ± 100 mA (Short Circuit Proof)
 100 ohms and 5000pf
 10 milliohms

 20V or 20mA
 80 μ Secs to within 0.05% or 50 μ V RTI

 0-50 °C
 Greater than 1000 Megs

115/230V 50-500cps 10 watts

 8.75" x 1.66" x 19"
 E
 5 lbs
 7.75 lbs

 100745
 21.25" x 4.75" x 10.25"
 H
 10 Unit 100835
 10.5" x 19" x 21.5"
 J

See Page 3

10-1000

 $\pm 0.02\%$
 $\pm 0.01\%$
 $\pm 0.01\%$

 See Page 3
 None

 100 cps - 100 Kc
 See Page 3
 6×10^6 volts/sec

 NA
 NA
 NA
 NA
 NA
 NA
 NA

Less than 0.01%

 $\pm \left\{ \begin{array}{l} 3\mu\text{V RTI} + 300\mu\text{V RTO} \\ 10\mu\text{V RTI} + 300\mu\text{V RTO} \\ 1\mu\text{V RTI} \text{ typically} \end{array} \right.$
Bandwidth Noise

100Kc	(10 μ V RTI + 300 μ V RTO) RMS	
1Kc	20 μ V RTI peak/peak	} +300 μ V RMS RTO
300cps	14 μ V RTI peak/peak	
30cps	4 μ V RTI peak/peak	

0-1000 ohms

1000 Megohms

20 μ Secs to 0.01%
 ± 10 V
 ± 100 mA (Short Circuit Proof)
 100 ohms and 5000pf
 10 milliohms

 20V or 20mA
 150 millisecs

 0-50 °C
 Greater than 1000 Megs

115/230V 50-500cps 10 watts

 8.75" x 1.66" x 19"
 E
 5 lbs
 7.75 lbs

 100745
 21.25" x 4.75" x 10.25"
 H
 10 Unit 100835
 10.5" x 19" x 21.5"
 J

See Page 3

(3) Output Impedance: All amplifiers except 259, 260 and 276/278 utilize remote feedback techniques to obtain low output impedance after the mating connector and a small length of cable.

(4) Power Requirements: All amplifiers are available with either $115\text{V} \pm 10\%$ or $230\text{V} \pm 10\%$ primary power. Specify with order.

RTO Referred to the Output

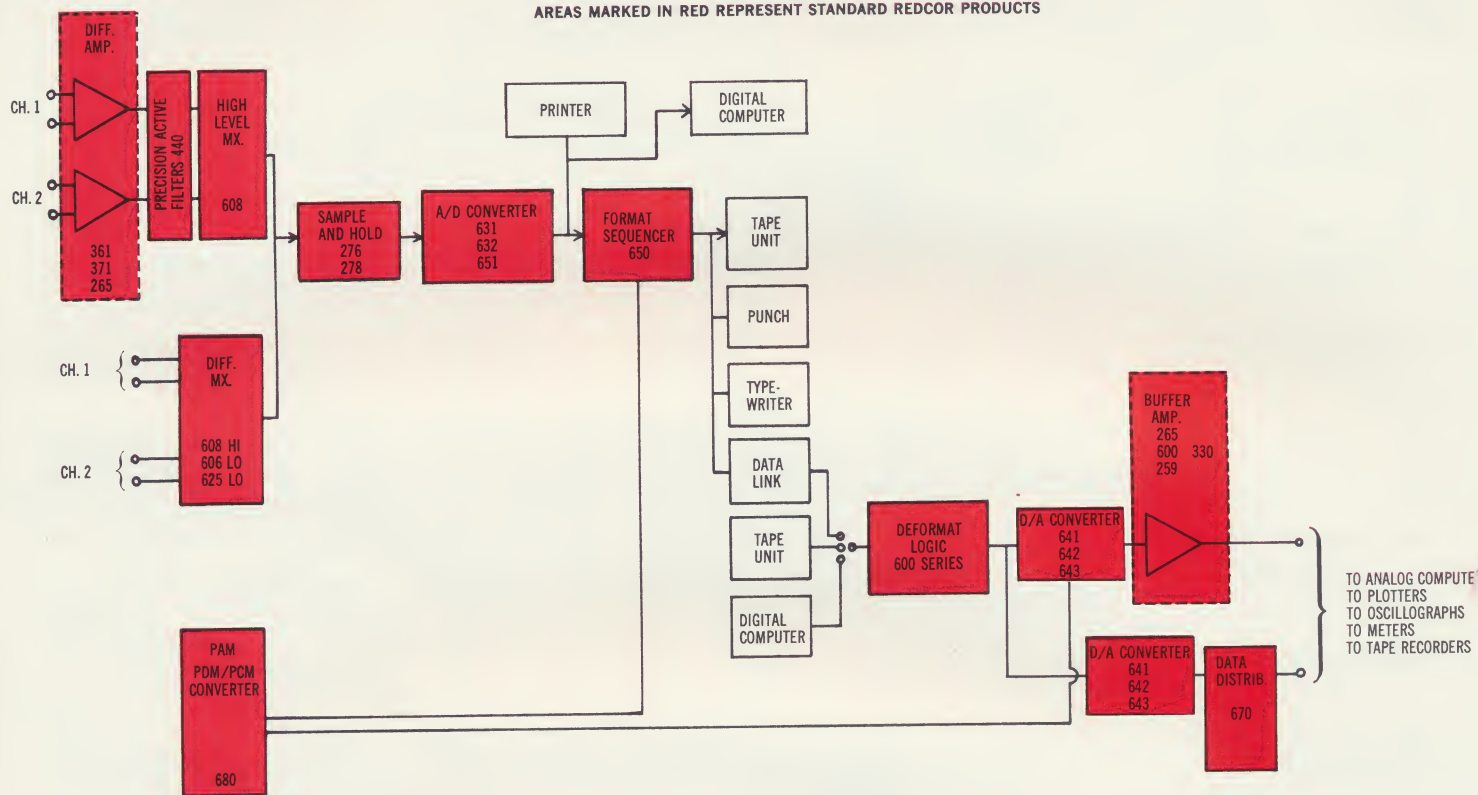
RTI Referred to the Input

complete systems compatibility....



REDCOR

AREAS MARKED IN RED REPRESENT STANDARD REDCOR PRODUCTS



Representatives in Major Cities of the World



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